CHAPTER 5

SELECTION OF TREATMENT PROCESSES

5-1. General. The method for treating domestic wastewater flows at mobilization facilities will be dictated by existing physical, economic, and environmental conditions at the site. Such conditions include the availability of land, fuel, building materials, construction and process equipment, skilled construction and operations forces, and transportation facilities. Designs requiring low energy consumption, unskilled labor, and relative ease of operation should be stressed.

5-2. Recommended treatment scheme. A wastewater treatment scheme has been presented within the mobilization scenario. This scheme will be given first consideration with regard to the restrictions and requirements outlined above. The treatment units and processes specified in this scheme will be in accordance with the guidelines and criteria presented in their respective chapters of this manual. The recommended treatment scheme presents two methods of operation and the decision on which method to use dependent on flow quantity.

a. For flows less than or equal to 0.2 mgd. Imhoff tanks followed by waste stabilization ponds will be used. Figure 5-1 presents a schematic diagram for this treatment operation. Standard drawings and specifications identified by Mobilization Drawing Code M 830-00-A have been prepared to assist the designer of this treatment method.

b. For flows greater than 0.2 mgd but less than or equal to 1 mgd. Oxidation ditches followed by secondary clarification will be used. Figure 5-2 presents a schematic diagram for this treatment operation. Standard drawings and specifications identified by Mobilization Drawing Code M830-00-B have been prepared to assist the designer of this treatment method.

c. For flows greater than 1.0 mgd. Treatment of flows greater than 1.0 mgd will entail the duplication of the major units employed in the oxidation ditch scheme. For example, a 1.5 mgd plant will require use of two oxidation ditches and two clarifiers. Duplication of auxiliary units such as screens, sludge beds, and chlorine basins would be determined on a case-by-case basis.

d. For all flows. For all methods, disinfection by chlorination is optional depending on need to disinfect which is dependent on water use downstream of the discharge point. Sludges generated from each process will be dewatered by the use of sand-drying beds and be disposed of at

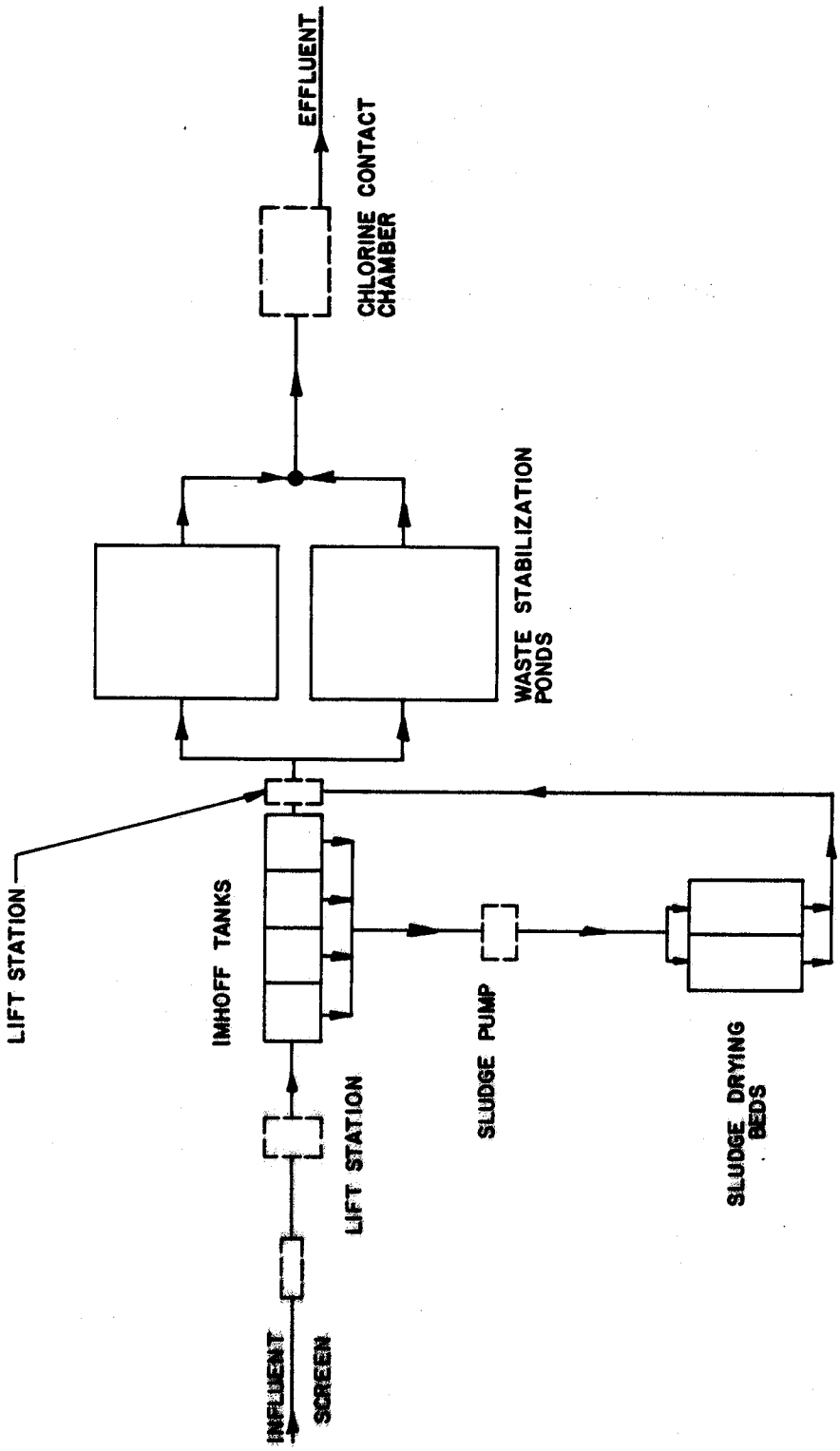

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FIGURE 5-1 TREATMENT SCHEME FOR FLOWS LESS THAN OR EQUAL TO 0.2 MGD

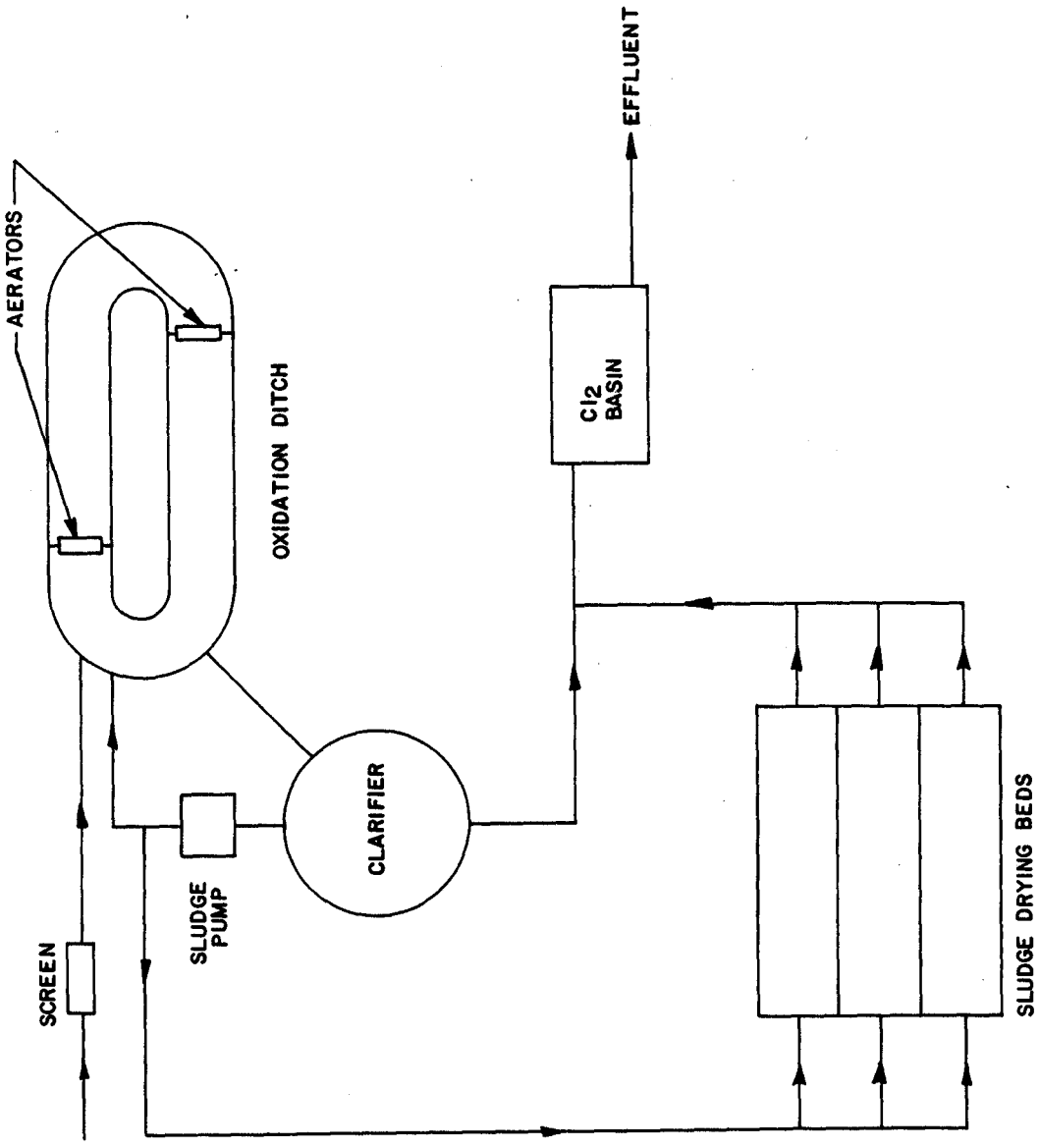

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FIGURE 5-2 TREATMENT SCHEME FOR FLOWS GREATER THAN 0.2 MGD

a sanitary landfill or by land application. As a minimum, manually-cleaned screens should be provided at the head of the plant to remove heavy debris which may hinder the treatment processes.

5-3. Alternative treatment designs. Although the treatment methods presented above are the ones to be considered first for mobilization work, situations may arise which make their use unfeasible. One example would be the scarcity of land for ponds and oxidation ditches. In this case, a treatment method requiring less land area would be mandated. Such a design could include the more compact activated sludge systems. Another example would be the immediate availability of trickling filter equipment making this system more desirable. All legitimate alternatives to the recommended treatment scheme should be identified and investigated by the evaluation of restricting parameters and governing conditions.

5-4. Regulatory requirements. The NPDES Permit obtained from the local Federal regulatory agency office by the installation to which the permit is issued will generally determine the treatment requirements. Effluent requirements for new Federal facilities that establish maximum pollution discharge limitations will be provided by coordination of the Corps of Engineers Design Office with the regulatory agency.

5-5. Impact on receiving waters. The toxicity, coliform count, BOD, COD, settleable solids, and nutrient load of the waste stream must be considered in determining its impact on the receiving waters. The impact is dependent on the ability of the water body to assimilate the waste stream. Dissolved oxygen (DO) levels provide one of the means to interpret the impact. Increased waste loads cause increased microbial activity, exerting a high oxygen demand and a lowering of the DO level of the receiving water. The DO level affects the viability of most aquatic life and is used in setting stream standards. Seasonal variations must be considered.